

CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A dielectric material comprising a Group III metal oxide and a Group V element.
2. A dielectric material according to claim 1, wherein said Group III metal oxide is aluminum oxide.
3. A dielectric material according to claim 1, wherein said Group V element is selected from the group consisting of nitrogen and phosphorous.
4. A dielectric material according to claim 2, wherein said Group V element is selected from the group consisting of nitrogen and phosphorous.
5. A dielectric material according to claim 1, wherein said dielectric material has a fixed charge density of less than $2 \times 10^{11}/\text{cm}^2$.
6. An electronic component containing a layer of dielectric material, said dielectric material layer comprising a Group III metal oxide and a Group V element.
7. An electronic component according to claim 6, wherein said Group III metal oxide is aluminum oxide.
8. An electronic component according to claim 6, wherein said Group V element is selected from the group consisting of nitrogen and phosphorous.

9. An electronic component according to claim 7, wherein said Group V element is selected from the group consisting of nitrogen and phosphorous.
10. An electronic component according to claim 6, wherein said dielectric material has a fixed charge density of less than $2 \times 10^{11}/\text{cm}^2$.
11. An electronic component according to claim 6, said component comprising a transistor wherein said dielectric material is a gate oxide of said transistor.
12. An electronic component according to claim 6, wherein said component comprises a capacitor, said dielectric material forming a dielectric layer between conductive layers of said capacitor.
13. A method of fabricating a dielectric material, said method comprising: incorporating a Group V element in a Group III metal oxide.
14. A method according to claim 13, wherein said Group III metal oxide is aluminum oxide.
15. A method according to claim 13, wherein said Group V element is selected from the group consisting of nitrogen and phosphorous.
16. A method according to claim 14, wherein said Group V element is selected from the group consisting of nitrogen and phosphorous.

17. A method according to claim 13, wherein said dielectric material is deposited in an atmosphere comprising a mixture of oxygen and nitrogen.

18. A method according to claim 17, wherein said mixture of oxygen and nitrogen has an oxygen-to-nitrogen ratio ranging from 24:6 to 9:21.

19. A method according to claim 17, wherein said mixture of oxygen and nitrogen has an oxygen-to-nitrogen ratio of 18:12.

20. A method according to claim 13, wherein said dielectric material is deposited in an atmosphere comprising a mixture of oxygen and phosphorous.

21. A method according to claim 13, wherein said dielectric material is formed by a technique selected from the group consisting of reactive sputtering, annealing, atomic layer deposition (ALD), chemical vapor deposition (CVD), metalorganic chemical vapor deposition (MOCVD), plasma nitridation, and oxidation of metal nitrides.

22. A method according to claim 13, wherein said Group V element is incorporated by annealing the Group III metal oxide in the presence of a gas selected from the group consisting of N₂O, NO, and NH₃.

23. A method according to claim 13, wherein said Group V element is incorporated by atomic layer deposition of the Group III metal oxide in the presence of a gas selected from the group consisting of N₂O, NO, and NH₃.

24. A method according to claim 13, wherein said Group V element is incorporated by chemical vapor deposition of the Group III metal oxide in the presence of a gas selected from the group consisting of N₂O, NO, and NH₃.

25. A method according to claim 13, wherein said Group V element is incorporated by plasma nitridation of the Group III metal oxide.

26. A method according to claim 13, wherein said Group V element is incorporated by oxidation of a metal nitride.